3. LOCKING HUB SYSTEM

The transfer case and the TCCU differ from previous models only in the speed sensor related parts. However, the vacuum locking hub operation system works oppositely from previous models and its components also have changed. The vacuum locking hub that is applied to Kyron uses the IWE (Integrated Wheel End) system, and in this system, the vacuum is generated only within the hub actuator.

It is structured to transmit power to the front section after the actuator hub is engaged following the release of vacuum from the drive shaft end gear and the hub end gear.

Vacuum generation process in front hub actuator:
Vacuum System

- Vacuum operation during 2WD mode
  During 2WD mode, the vacuum pressure from vacuum pump is continuously transmitted to the locking hub system. This vacuum pressure pulls in the locking hub actuator so that it will not be engaged with the front end hub gear.

- In 4WD mode, the TCCU blocks the transferring of vacuum pressure from vacuum pump to locking hub by supplying the power to solenoid valve.

- 2WD (applying vacuum pressure to hub actuator)
  The vacuum pressure pulls in the locking hub actuator so that it will not be engaged with the front end hub gear.

- 4WD (releasing vacuum pressure from hub actuator)
  The vacuum pressure is released from the hub actuator. At this time, the front hub end gear is engaged.

- Atmosphere (in 4WD mode)
**Components of IWE (Integrated Wheel End)**

**Front Hub Assembly**

The front hub assembly is connected to the tire and it drives the wheel by receiving the rotation force from the drive shaft during 4WD mode. When the hub actuator is moved to the gear (vacuum pressure released), the 4WD mode is engaged. When the hub actuator is out of the gear (vacuum pressure applied), the 4WD mode is cancelled.

**Rubber O-ring**

Replace it with a new one when removing. Function: preventing moisture and foreign matter from entering into gears.

**Steel O-ring**

Preventing the actuator hub from pressing against the wheel end hub.

Apply the grease to the steel O-ring before installation.

**NOTICE**

- Rubber O-ring: Replace it with a new one when removing/installing the front hub.

**Front Drive Shaft**

The front drive shaft is the part that receives the power when the transfer case operates in 4WD mode. During the 2WD mode, the hub actuator is positioned at the drive shaft end, and during the 4WD mode, the hub actuator is interlocked to the drive shaft end gear and the front hub end gear.
**Solenoid Valve**

The vacuum solenoid valve is installed at bottom of the battery tray (theft warning horn side) and serves the function that allows to connect and block the vacuum pressure from vacuum pump to hub actuator.

During the 2WD mode, a vacuum line is established between vacuum pump and hub actuator. During the 4WD mode, the TCCU applies 12V to the vacuum solenoid to block the vacuum pressure.

**Locking Hub Actuator**

This device transfers or blocks the output from drive shaft to the front wheel end according to the vacuum pressure. Unlike the conventional systems, the vacuum pressure to the front wheel end operates only within the actuator.
2WD:
The locking hub actuator is out of the front wheel hub end gear when applying the vacuum pressure.

4WD:
The locking hub actuator is engaged with the front wheel hub end gear when releasing the vacuum pressure.
Front Wheel End in Vehicle with 4WD

Front Wheel End in Vehicle without 4WD
**Vacuum Locking Hub Check**

Compared to conventional locking hub systems, when the vehicle is in 2WD mode, the vacuum pressure from vacuum pump is continuously applied to the locking hub actuator. If any vacuum line is leaking, the 4WD system may not operate. Make sure that the vacuum lines are not leaking.

How to check the vacuum locking hub system:
1. Disconnect hub actuator vacuum line from vacuum solenoid valve.
2. Connect vacuum gauge to vacuum line of hub actuator.
3. Check vacuum pressure with vacuum pressure gauge.

**2WD: vacuum pressure applied**

During 2WD mode, the vacuum pressure is applied to the locking hub actuator and the drive shaft is separated from the front wheel hub end gear. Thus, when applying the vacuum pressure with a vacuum pressure gauge, only the wheel must rotate.

**4WD: vacuum pressure released**

During 4WD mode, the vacuum pressure is released from the locking hub actuator and the drive shaft is engaged with the front wheel hub end gear. Thus, when releasing the vacuum pressure (gauge indication: 0) with a vacuum pressure gauge, the drive shaft should be rotated along with the wheel.
Hub Actuator Check

Disconnect the vacuum hose from the hub actuator and install the vacuum pressure gauge to the hub actuator. Apply vacuum pressure to make sure the hub actuator maintains vacuum condition.

If the vacuum pressure is maintained, the actuator hub component condition is OK.

If the vacuum pressure is not maintained, replace the actuator with a new one.